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# ***MASTER OF MILITARY STUDIES***

## ***LIGHT ARMORED VEHICLES IN OPERATIONS OTHER THAN WAR***

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF MILITARY STUDIES

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<p>ABSTRACT. This study proposes that the Light Armored Vehicle (LAV) is an ideal system for service in Military Operations Other Than War (MOOTW), and that the Marine Corps must preserve this capability if it is to be able to continue to contribute effectively to these missions. The flexibility, mobility, and relative firepower of the Light Armored Vehicle (LAV) has been tested in real world operations in Panama, Somalia, and Kosovo. The doctrinal missions exist in MOOTW for light armor to perform, and certainly the doctrinal employment of light armor is not at odds with the requirements of MOOTW. The Marine Corps is embarking on a Service Life Extension Program (SLEP) that will take the vehicle to 2015, when a replacement is to be fielded. The MAGTF Expeditionary Family of Fighting Vehicles (MEFFV) is to replace both the LAV and the tank in 2020. There is a five-year gap, more if there are delays in the MEFFV development and acquisition process, which the Marine Corps must address in order to maintain uninterrupted LAV capability.</p>		
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## **Executive Summary**

**Title:** Light Armored Vehicles in Operations Other Than War.

**Author:** Lieutenant Colonel Richard A. DeForest, U.S. Marine Corps.

**Thesis:** This study proposes that the Light Armored Vehicle (LAV) is an ideal system for service in Military Operations Other Than War (MOOTW), and that the Marine Corps must preserve this capability if it is to be able to continue to contribute effectively to these missions.

**Discussion:** The flexibility, mobility, and relative firepower of the Light Armored Vehicle (LAV) has been tested in real world operations in Panama, Somalia, and Kosovo. These contingencies were used as case studies with information drawn from interviews of participants, articles in professional journals, book-length studies, the Marine Corps Lessons Learned System, and official reports.

Joint Doctrine for Military Operations Other Than War lists sixteen types of MOOTW operations, and in these three contingencies LAI/LAR performed seven of those. Additionally, in all three contingencies, LAI/LAR were called upon to execute four of the six standard reconnaissance and security missions, and they performed two of the five standard armor missions. Clearly the doctrinal missions exist in MOOTW for light armor to perform, and certainly the doctrinal employment of light armor is not at odds with the requirements of MOOTW. An analysis using the six warfighting functions further validated that LAVs, as structured and doctrinally employed by the Marine Corps, offer the commander great flexibility with an excellent economy of force, as evidenced by company sized units of LAVs performing critical missions for commanders in each contingency.

The success and value of these deployable, employable, mobile, and flexible platforms has led the U.S. Army to take a significant step in spending some \$4 billion to purchase 2,000 3rd generation Light Armored Vehicles in a major shift from tracks to wheels. This shift is in recognition of the demonstrated cross-country mobility of this wheeled vehicle and the simplified logistics and maintenance required by forward-deployed units away from fixed infrastructure. The post-cold war era saw an explosion in "smaller-scale contingencies" over the last decade, with the accompanying need for deployable and versatile forces.

The Marine Corps is embarking on a Service Life Extension Program (SLEP) that will take the vehicle to 2015, when a replacement is to be fielded. The MAGTF Expeditionary Family of Fighting Vehicles (MEFFV) is to replace both the LAV and the tank between the 2019 and 2023 timeframe.

**Conclusions and Recommendations:** There is a five-year gap, more if there are delays in the MEFFV development and acquisition process, which the Marine Corps must address in order to maintain uninterrupted LAV capability. The Marine Corps must decide by 2008 whether to fund a Service Life Extension Program Enhancement (SLEP-E) to extend the current vehicle beyond 2015 while continuing to pursue the MEFFV, or to move forward with purchase of either the LAV III or a smaller like vehicle to be fielded in 2015. If the Marine Corps chooses to conduct a SLEP-E while pursuing the MEFFV then a second decision point arrives in 2015. An assessment must be made to either continue with the MEFFV or to field the LAV III or a smaller like vehicle by 2022. Failure to recognize and act on these critical decision points could leave the Marine Corps without a valuable capability, and a vacuum the U.S. Army will seek to fill. The Marine Corps should aggressively pursue the development of the MEFFV to guarantee that these capabilities are resident for the use of future commanders. In the interim, the Marine Corps must guard against the chipping away of current capabilities by such actions as the reductions proposed, but not adapted, during the recent Authorized Acquisition Objective Tailoring Conference. Finally, the SLEP and future modifications should seek to provide this proven platform with every advantage if it is to continue to remain such a viable asset to future commanders who will be expected to successfully perform missions across the full spectrum of conflict.



## Introduction

This study proposes that the Light Armored Vehicle (LAV) is an ideal system for service in Military Operations Other Than War (MOOTW), and that the Marine Corps must preserve this capability if it is to be able to continue to contribute effectively to these missions. The Service Life Extension Program (SLEP) will provide much-needed upgrades to the Light Armored Vehicle. The SLEP will extend the service life of the LAV until 2015, then a single fighting vehicle will replace it, and the M1A1 tank. This new vehicle, the MAGTF Expeditionary Family of Fighting Vehicles (MEFFV), should draw on our operational experience with the LAV in order to preserve the advantages of this vehicle even, if necessary, at the expense of acquiring tank-like survivability, mobility, and firepower.

The Marine Corps' significant participation in MOOTW is a natural byproduct of the strategic mobility and readiness provided by forward deployed, sea-based forces. The Marine Corps has experienced a virtual explosion in MOOTW over the last quarter century, since the conclusion of the war in Vietnam. Aside from a short conventional war with Iraq, "Operation Desert Storm," and the Kosovo air war, the execution of MOOTW missions comprise the entire U.S. military operational experience for more than twenty-

five years. The National Security Strategy recognizes the need for readiness in responding to these "Smaller-scale contingency operations."<sup>1</sup> The increasing number of smaller scale contingency operations that the National Security Strategy envisions are simply the small wars, low intensity conflicts, or Military Operations Other Than War, that the Marine Corps has engaged in throughout the 20<sup>th</sup> Century and fall very much within our tradition.

Much has been written on the subjects of small wars, low intensity conflict, and MOOTW. Indeed, there has also been a great deal of examination of the performance of the U.S. Marine Corps, the other services, and Joint Task Forces in such operations. However, there is very little in either the professional or academic literature which examines the performance of LAV units in these MOOTW. Yet the U.S. Marine Corps is investing a great deal of money in a Service Life Extension Program (SLEP). According to Major Brian C. Colebaugh, USMC, with the Program Manager, Light Armored Vehicles, Transportation and Automotive Command, Warren, Michigan the SLEP includes: a thermal signature

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<sup>1</sup> *A National Security Strategy For A New Century* (The White House, December 1999), 18. This document states specifically that: "In addition to defending the U.S. homeland, the United States must be prepared to respond to the full range of threats to our interests abroad. Smaller-scale contingency operations encompass the full range of military operations short of major theater warfare, including humanitarian, peace operations, enforcing embargoes and no fly zones, evacuating U.S. citizens, and reinforcing key allies. These operations will likely pose frequent challenges for U.S. military forces and cumulatively require significant commitments over time. These operations will also put a premium on the ability of the U.S. military to work closely and effectively with other U.S. Government agencies, non-governmental organizations, regional and international security organizations and coalition partners."

treatment (engine compartment/muffler system) to increase survivability by reducing the heat signature of the vehicle; possibly add-on camouflage panels; a series of electrical upgrades to include new circuit breakers, wiring harnesses, and new circuitry in the turret and gun control assemblies to improve reliability; upgrades in maintainability and supportability in the form of better corrosion control, and by making the power pack easier to remove and replace; a new instrument panel; a new generation II thermal sight; a laser range finder with a displaced reticule to enable the gunner to achieve quicker hits or "burst on target"; and, possibly, a laser designator with which to mark targets for laser guided munitions. These and other improvements aim to extend the LAV's viability through 2015.<sup>2</sup> On a separate track, the U.S. Army is purchasing 2,131 LAV III's to equip Interim Brigade Combat teams at a cost of \$4 billion.<sup>3</sup>

Since all three of the above mentioned projects will require large investments of money and resources, there are several questions worth considering. Are the services spending money wisely on this asset? Will the returns,

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<sup>2</sup>Major Brian C. Colebaugh, USMC, Platoon Commander, 2<sup>nd</sup> Platoon, Company D, 2<sup>nd</sup> Light Armored Infantry Battalion during Operation Just Cause, telephone interview by author, 10 January 2002.

<sup>3</sup>"Army Selects LAV III Variants to Equip New Interim Brigades," *Armor*, vol. 110, no 1 (January-February 2001), 13-15.

particularly during the increasing number of "smaller-scale contingencies," justify the investment?

The answers to these questions lie in a three-tier approach: First, an examination of the joint doctrine for MOOTW, and of the doctrinal employment, capabilities, and limitations of LAV units which will provides a framework for an understanding of how such units can be employed; second, a review of three historical cases involving LAV employment in MOOTW during the U.S. intervention in Panama, humanitarian relief efforts in Somalia, and peace operations in Kosovo; third, an analysis of LAV performance in MOOTW. From this study, an assessment of capabilities and past performance should reveal the future potential of LAVs in MOOTW and necessary decision points for our senior leadership.

### **Vehicles, Organization and Structure**

Fielding of the Light Armored Vehicle began in 1983, with the first units established in 1984. The organization and mission of the unit is based on a family of LAVs. Some basic information is in order:

#### **LAV Series (1983)**

Crew: Three (Seats additional four to six troops)

Weight: 24,418 pounds

Armor: 0.5-inch aluminum (appliqué kit effective vs. 14.5mm AP at 300m)

Armament: One 25mm M242 cannon and one 7.62mm machine gun in turret, one 7.62mm machine gun on turret

Engine: Detroit Diesel 6V53T V6, 275 hp

Speed: 60mph land, 6.5mph water

Range: 430 miles

Miscellaneous: 8x8 wheel drive, based upon Swiss Mowag design built under license by GM Canada. Fully stabilized gun. Variants include: 81mm mortar, TOW antitank missile, command, logistics, recovery, and air defense vehicles.

Note 1: There are only 17 air defense variants and they are located with the reserves in 4<sup>th</sup> Battalion.

Note 2: A thermal sight was fielded in 1996.<sup>8</sup>

To reduce confusion, it is important to note that the three active and one reserve battalions were designated as Light Armored Vehicle (LAV) in 1984-1988, re-designated Light Armored Infantry (LAI) in 1988-1993, and re-designated again as Light Armored Reconnaissance (LAR) Battalions in 1993.<sup>9</sup> This changing of the names reflects a maturing of the concept of employment. For the purposes of this study, it is important to understand that the primary vehicle is an LAV-25 (meaning 25mm) with a crew of three, plus four scouts.

A complete review of the battalion organization is unnecessary beyond understanding that there are four line companies and a Headquarters and Service Company. A line company typically has three platoons of two sections; each section consists of two LAV-25s. There is one antitank section with two teams, each team consists of two LAV-AT (TOWs). Additionally, there is one mortar section of two LAV-M (81mm), two logistics variants, one command and control variant, and one recovery variant. Units can

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<sup>8</sup>Kenneth W. Estes, *Marines Under Armor* (Annapolis, MD: Naval Institute Press, 2000), 212.

attach and detach elements in task organizing for a specific mission or operation. However, the basic company is as shown above.<sup>10</sup>

The vehicle, structure, and organization are built to perform Armored Cavalry missions of reconnaissance and security for the Marine Air Ground Task Force (MAGTF). An examination of the doctrine, capabilities, and limitations of Light Armored Vehicles is essential in evaluating possible roles in MOOTW.

### **Doctrinal Background**

The joint doctrine of the United States, published in *Joint Publication 3-07, Joint Doctrine for Military Operations Other Than War*, states: "Military Operations Other than War focus on deterring war, resolving conflict, promoting peace, and supporting civil authorities in response to domestic crisis."<sup>11</sup> Also, "MOOTW may involve elements of both combat and non-combat operations in peacetime, conflict, and war situations."<sup>12</sup> Therefore, we find that MOOTW can encompass the majority of military operations across the spectrum, ranging from the benign humanitarian relief to combat operations short of major

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<sup>9</sup>*Ibid*, 217.

<sup>10</sup> *Marine Corps Reference Publication (MCRP) 5-12D, Organization of Marine Corps Forces*, n.p.

<sup>11</sup> Joint Chiefs of Staff (JCS), *Joint Pub 3-07, Joint Doctrine for Military Operations Other Than War* (Washington, DC: GPO, 16 June 1995), I-1.

theater war. This requires forces and capabilities that are inherently flexible, given the broad range of possible taskings.

In executing MOOTW, joint doctrine identifies six principles: objective, unity of effort, security, restraint, perseverance and legitimacy.<sup>13</sup> Of these principles, the one that levies the greatest demand on a unit's capabilities is security, which requires maintaining the military, political, and informational upper hand.<sup>14</sup> While there are similarities between security and force protection as defined in the *Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms*, security has a broader applicability, beyond individuals and units, to the success of the mission itself.<sup>11</sup> The military advantage derived from security is predicated on a credible capacity to coerce without using excessive force. The capability to avoid having to escalate the use of force contributes to the legitimacy of the political objective, deters aggression, and precludes unnecessary casualties on either side, thus preventing a situation spiraling out of control. Security includes

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<sup>12</sup> *Ibid*, I-1.

<sup>13</sup> JCS, *Joint Pub 3-07*, II-1.

<sup>14</sup> JCS, *Joint Pub 3-07*, II-I.

<sup>11</sup> Joint Chiefs of Staff, *Joint Pub 1-02, Department of Defense Dictionary of Military and Associated Terms* (Washington, DC: GPO, 1 December 1989), under the word "security."

<sup>12</sup> JCS, *Joint Pub 3-07*, I-2.

maintaining the political advantage, for loss of that advantage may mean a loss in the legitimacy of U.S. or coalition objectives or presence. Joint doctrine states that "Political objectives drive MOOTW at every level from strategic to tactical."<sup>12</sup> The doctrine requires not just commanders, but all military personnel, to "understand the political objectives and the potential impact of inappropriate actions."<sup>13</sup> Hence, security in the sense of force protection, a credible capacity to coerce, and restraint require forces trained and equipped to operate in this environment. The third issue of security is maintaining the informational upper hand. In fact, intelligence and information gathering are identified as key planning considerations.<sup>14</sup> This informational advantage serves to enhance both the interests of force protection and the maintaining of the political advantage in serving the policy objective. Again, this will require forces trained and equipped to perform the necessary information collection and reporting.

In examining joint doctrine, it is evident that forces must be flexible enough to perform a broad spectrum of

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<sup>13</sup> JCS, *Joint Pub 3-07*, I-2

<sup>14</sup> *Ibid.*

missions, possess the ability to defend themselves and exercise restraint by using minimum force, and that they will need to collect and report information. Many of these requirements for security fall under the six warfighting functions: command and control, maneuver, fires, intelligence, logistics, and force protection. Marine Corps Reference Publication 5-12C, Marine Corps Supplement to the DOD Dictionary of Military and Associated Terms, describes the warfighting functions as "six mutually supporting military activities integrated in the conduct of all military operations,"<sup>15</sup> and as seen in studying joint doctrine, these functions mesh seamlessly into the requirement for security in MOOTW.

This leads to an examination of doctrine for Light Armor and LAVs in particular, and one should begin with a review of capabilities and limitations. Capabilities associated with light armor in general are:

- "Support the close fight as part of a combined arms team using accurate anti-armor fires and direct fires.
- Use thermal sights to greatly enhance the night fighting capabilities of the combined arms team.
- Operate in opposed entry role.
- Detach quickly from their parent unit and be employed during initial stages of contingency or reinforcing operations.
- Use strategic and tactical mobility to advantage.
- Small arms...overhead artillery fire protection.
- Accomplish rapid movement and limited penetrations.

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<sup>15</sup> MCRP 5-12, *Marine Corps Supplement to the Department of Defense Dictionary of Military and Associated Terms*, n.p. 1994, under the entry "warfighting functions."

- Exploit success and pursue defeated enemy elements as part of a larger force."<sup>16</sup>

Limitations with light armor in general are:

- "Does not possess survivability of a main battle tank.
- Consumption of supply items is moderate to high, especially in classes III, V, and IX.
- Mobility and firepower are restricted in extremely close terrain.
- May lack organic assets to transport supply needs in classes III, V, and IX."<sup>17</sup>

Standard security and reconnaissance missions are identified as:

- "Guard (with reinforcement).
- Screen.
- Zone or area reconnaissance.
- Reconnaissance and security.
- Route reconnaissance and security.
- Counter-reconnaissance."<sup>18</sup>

Standard armor missions are:

- "Movement to contact.
- Hasty attack.
- Deliberate attack.
- Exploitation.
- Pursuit."<sup>19</sup>

Doctrinally, there exists a broad variety of combat capabilities and missions which can be performed by light armor units as identified in *Army Field Manual 17-18, Light Armor Operations*. However, limitations of survivability (versus anti-armor and armor threats), dangers of close terrain (including urban) in negating mobility and firepower advantages and, finally, the higher logistical and maintenance requirements for armored forces must be

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<sup>16</sup>*Field Manual (FM) 17-18, Light Armor Operations* (Washington, DC: Department of the Army, March 1994), 1-8.

<sup>17</sup>*Ibid*, 1-8.

<sup>18</sup>*FM 17-18*, 1-9.

<sup>19</sup>*Ibid*, 1-9.

considered when examining the utility of such forces in operations other than war.

Regarding the LAV specifically, U.S. Marine Corps doctrine echoes the capabilities, limitations, and missions contained above. In discussing MOOTW, the doctrine emphasizes that the LAV is of use to the MAGTF in: *controlling larger areas, given favorable terrain; accomplishing reconnaissance and security missions; establishment of mobile blocking positions; as a reaction or counterattack force; raids and recovery; and for evacuation missions.*<sup>20</sup>

A review of the joint doctrine for MOOTW and of the Light Armor and LAV-specific doctrine reveals no significant conflict between the requirements for MOOTW operations and the capabilities and limitations of LAVs. In fact, the broad range of light armor missions indicates compatibility with the flexibility needed in MOOTW environments. The armor protection, albeit against small arms, and firepower relative to anything short of tanks provides these units with the force protection, ability to exercise restraint, and deterrent capability sought after in joint doctrine. The LAV enables the Light Armored

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<sup>20</sup> (FMFM) 6-30, *Light Armored Infantry Operations* (Quantico, VA: Marine Corps Combat Development Command, October 1990), 5-20.

Reconnaissance units to contribute to maintaining the information advantage discussed in joint doctrine through "mobile surveillance and saturation patrolling."<sup>21</sup> Although not discussed specifically, the mobility of light armor and the LAV in particular is the enabler to "controlling large areas" for the MAGTF, to accomplishing the "mobile" surveillance and reconnaissance discussed above, and for most of the capabilities and missions discussed. Thus, the flexibility, mobility, and relative firepower of the LAV seem ideally suited to performing a wide variety of roles and missions in MOOTW.

### **Case Studies**

Marines in Light Armored Infantry units and later Light Armored Reconnaissance units would "test" the LAV in real world operations in Panama, Somalia, and Kosovo. In doctrine, we see the framework for capabilities to accomplish missions and in operations we see the historical context in which capabilities are tested against missions.

The information provided in each case study is drawn from interviews of participants, articles in professional journals, book-length studies, the Marine Corps Lessons Learned System, and Official Reports. Once again, the

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<sup>21</sup>*Ibid*, 5-20.

following issues merit questioning: does the LAV as structured and employed by the U.S. Marine Corps measure up to the promise of doctrinal capabilities and employment? Are the acknowledged limitations more significant than perceived? Were LAV units, with their inherent capabilities and limitations, able to perform, or contribute to, the six warfighting functions and the MOOTW principle of security? Each operation represented significant challenges for U.S. forces and each is examined for the participation of LAV units to determine the significance of their participation to the success of the mission.

#### **Experience in Panama**

2nd Light Armored Infantry Battalion deployed sequentially four companies to Panama between May 1989 and June 1990 as part of Marine Forces Panama.<sup>22</sup> During that time, four different companies from 2<sup>nd</sup> LAI Battalion rotated through Panama on 90-day deployments. The first two units, Company A and Company B, participated in OPERATION NIMROD DANCER as a part of the effort to protect American lives and property. Company D participated in OPERATION JUST CAUSE, the intervention to remove General Noriega from power as head of Panama. Finally, Company C

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<sup>22</sup> Colonel R.P. Mauskopf, USMC, and Major E.W. Powers, USMC, "LAVs in Action," *Marine Corps Gazette*, vol. 74, no 9 (September 1990), 50-54.

participated in OPERATION PROMOTE LIBERTY as a nation building, civic action mission to restore democracy to Panama.<sup>23</sup> During these operations, LAI would execute a variety of missions ranging from nation building to combat operations.

During OPERATION NIMROD DANCER, two successive LAI companies from 2<sup>nd</sup> LAI Battalion, 2<sup>nd</sup> Marine Division, operated to reinforce U.S. security and to ensure freedom of movement under the Carter-Torrijos Treaty, signed in 1979, which states that the U.S. would continue to provide for the defense of the Panama Canal until the gradual transition of operational control was complete in 1999. General Noriega's rise to power, his assistance and involvement with Colombian drug cartels, his repression of any opposition party, and criticism of the U.S. presence led to a situation deteriorating out of control.<sup>24</sup>

Company A was the first to arrive. Captain Stephen J. Linder, Company Commander, Company A, 2d LAI describes the missions, task and purpose, performed by LAVs: "Initial missions consisted of convoy escort covering U.S. Army units, area and route reconnaissance, mounted and dismounted security patrolling, and reaction force

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<sup>23</sup> *Ibid*, 50-59.

missions."<sup>25</sup> The LAI company participated in exercises aimed to provide a show of force, and on several occasions swimming the Panama Canal to demonstrate operational maneuverability in an environment where the Panamanian Defense Force (PDF) was routinely trying to impede movement of U.S. forces. During this time, the company conducted reconnaissance and security patrols and inserted Surveillance and Target Acquisition (STA) teams as well.<sup>26</sup>

Company B was the next to arrive, and continued to conduct reconnaissance and security patrols. Captain John S. Dunn, Company Commander, Company B, 2d LAI details one advantage of wheeled vehicles over tracks when he wrote: "The U.S. Army possessed M113 armored personnel carriers (APCs) but was prevented from conducting vehicle reconnaissance through towns due to possible road damage caused by tracks."<sup>27</sup> Poor roads are a fact of life in many countries and the destruction of this limited road infrastructure by tracked vehicles may annoy the host nation, and its populace, or inhibit the use of these roads by U.S. vehicular traffic. Company B would go on to act as

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<sup>24</sup> Susan G. Horowitz, "Indications and Warning Factors," in *Operation Just Cause: The U.S. Intervention in Panama*, ed. Bruce W. Watson and Peter G. Tsouras (Colorado: Westview Press, 1991), 49-52.

<sup>25</sup> Mauskopf and Powers, 51.

<sup>26</sup> *Ibid.*, 51-52.

<sup>27</sup> Mauskopf and Powers, 52.

a reaction force for a U.S. Army blocking position during one of the unsuccessful coup attempts against Noriega.

By the time of Company D's arrival, the PDF and Noriega's "Dignity Battalions" were becoming more aggressive in establishing roadblocks and organizing protests. On one occasion, a negligent discharge of a 25mm by an LAV gunner resulted in a High Explosive (HE) round hitting a telephone pole and blowing it in half. A crowd, which had gathered, then quickly dissipated and the roadblock was cleared.<sup>28</sup> This show of force, unintentional though it was, had the desired effect of discouraging further aggression by the crowd. On another occasion, a crowd was more violent, and had Marines not possessed the force protection of an armored vehicle the situation would have either precluded the unit from accomplishing its mission, or would have risked the likelihood of greater injury, or death, of Marines or Panamanians. This force protection enabled the Marines to exercise restraint while accomplishing the mission. The situation was described in detail by authors Donnelly, Roth, and Baker in their book *Operation Just Cause, The Storming of Panama*: "When officials for the Center for Treaty Affairs approached, the

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<sup>28</sup> Colebaugh Interview, 10 January 2001.

crowd began waving Panamanian flags and hollering anti-American slogans. The crowd grew out of control and the Marines leapt to the safety of their LAVs. The Panamanians pounded the vehicles with rocks and sticks as the column inched forward to escape the crowd. One Panamanian rammed an LAV with a pick-up truck, puncturing the fighting vehicle's right front tire. As the LAV limped on, a woman protester threw her body onto the front of the vehicle. She fell backwards, feet in the air, and flipped over one of the roadblock vehicles. Shocked at the accident, the Panamanians began to beat on the LAVs with flagpoles, other objects, and even their bare hands. The U.S. force slowly made its way down the highway"<sup>29</sup>

Major Brian C. Colebaugh, a platoon commander, stated that the LAV scouts also played a key role, especially in built-up areas, when people would surround the patrol. Designated scouts would pull people out of the way, "flex-cuff" (plastic handcuffs) them, and move on. Additionally, a designated marksman (scout) would aim his rifle on any PDF enforcer who was inciting the crowd so as to discourage him from allowing the situation to grow too hostile or the crowd from becoming too aggressive.

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<sup>29</sup>Thomas Donelly, Margaret Roth and Caleb Baker, *Operation Just Cause: The Storming of Panama* (New York: Lexington Books, 1991), 184.

By December 1990, the situation had deteriorated to attacks on U.S personnel by the PDF that included assaults, rape, and finally the fatal shooting of 1<sup>st</sup> Lt. Paz, USMC, at a roadblock.<sup>30</sup> President George Bush thereupon ordered the U.S. military intervention named OPERATION JUST CAUSE.

Joint Task Force South was commanded by LTG Carl Stiner, the Commanding General of XVIII Airborne Corps. Marine Forces Panama would comprise Task Force Semper Fi, with one platoon attached to Task Force Bayonet, all under the operational control of the 7<sup>th</sup> Infantry Division.<sup>31</sup> In a Lessons Learned report submitted by Marine Forces, under Colonel Charles E. Richardson, which comprised Task Force Semper Fi, the value added by LAVs is detailed: "the Light Armored Vehicle's (LAV's) firepower, mobility, and armor coupled with the Fleet Antiterrorist Security Team's highly trained Close Quarters Combat Team (CQBT) provided a versatile and potent force, particularly for offensive operations and as a quick reaction force. The Loudspeaker teams (psychological operations) provided the means to offer an opportunity and in some cases persuade, the enemy to surrender without a fight."<sup>32</sup>

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<sup>30</sup>Horowitz in Watson and Tsouras, 49-52.

<sup>31</sup>Lorenzo Crowell, "The Anatomy of *Just Cause*: The Forces involved, the Adequacy of Intelligence, and Its Success as a Joint Operation," in Watson and Tsouras, 71.

<sup>32</sup>MCLLS #12559-16914

Task Force Semper Fi was responsible for securing an area of some six square miles southwest of Panama City, an area that included U.S. Naval Station Panama (Rodman), Howard Air Force Base, the Arraijan Tank Farm, and the Bridge of the Americas. PDF outposts and facilities were interspersed throughout the area, and offered resistance at the Arraijan Tank Farm, a fuel depot supporting Howard Air Force Base, and at a roadblock near the entrance to Howard Air Force Base.<sup>33</sup>

LTG Stiner was concerned about the security of Howard Air Force Base in particular, especially from mortar attack, as it would be the source of the majority of helicopter and fixed wing support for OPERATION JUST CAUSE. To accomplish this security mission, the Marines moved quickly in their LAVs to secure their blocking positions, and to position a rifle company in the hills to the rear of the Air Force base.<sup>34</sup>

Despite the success the Marines experienced in using the LAI and CQBT combination, their first objective would be an LAI-only operation. Tasked to assault and occupy the Department of Traffic and Transportation (DNITT) station near the entrance to Howard Air Force Base, the CQBT and

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<sup>33</sup>Crowell in Watson and Tsouras, 89.

<sup>34</sup>Donnelly, Roth, Baker, 85.

PSYOPS teams could not move through heavy fire in their unarmored HMMWV. However, LAVs provided direct fire support for dismounting scouts who would secure the defended station.<sup>35</sup> Light Armored Vehicles proved critical in providing fires and force protection for Marines and Soldiers clearing buildings enroute to Howard Air Force Base, and during Task Force Bayonet's search for Noriega. The ability of a small company to move through small arms fires, to secure intermediate objectives, in order to reach the Air Force Base before PDF or Dignity Battalion elements could interdict critical air transport operations was a mission essential task. LTG Carmen Cavezza, Commanding General of 7th Infantry Division, under which Task Force Semper Fi operated, highlighted the utility of the LAVs during an interview for the official XVIII Airborne Corps History.<sup>36</sup> Additionally, Malcom McConnell in his well-researched book on Operation Just Cause writes: "Although more media coverage was given to the Army operations in Panama City, the actions of Task Force Semper Fi were critical to the success of Operation Just Cause. Had the well-equipped and certainly well-motivated PDF and Dignity

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<sup>35</sup>Colonel J.M. Hayes, USMC, "Panama PROMOTE LIBERTY After Action Report," *Marine Corps Gazette*, vol 74, no 9 (September 1990): 59-62.

<sup>36</sup> Lieutenant General Carmen Cavezza USA, former Commanding General, 7<sup>th</sup> Infantry Division: Remarks from interview transcript (Ft Lewis, Washington, 30 April 1992), U.S. Army Center of Military History , URL: <http://www.army.mil/cmh-pg/documents/panama/jcit/jcit.html>, accessed 8 January 2001.

Battalion forces been able to maneuver near Howard Air Force Base and to hit the crowded runway with 81mm or 120mm mortars, the outcome of the entire operation might have been different."<sup>37</sup>

The LAVs taking down roadblocks, communication facilities, and protecting the airfield represented a tremendous economy of force operation as the bulk of U.S. troops were employed elsewhere in the Area of Operations. Although, the use of LAVs with Task Force Bayonet was less critical to the overall mission, the utility of LAVs in isolating an objective and providing fires for Special Forces illustrates again the flexibility of the platform for a variety of missions. Although, caution must be exercised when discussing the use of LAVs in urban operations that restrict their mobility and firepower, thus rendering them more vulnerable. LAVs can be used even here to isolate an objective area to prevent ingress and egress by enemy forces, and they can provide direct fire support to friendly forces. The platoon of LAVs discussed here, for example, could bring to bear significantly more firepower than an infantry company in support of the Special Forces teams clearing the buildings. Again, advantages must be

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<sup>37</sup>Malcolm McConnell, *Just Cause: The Real Story of America's High-Tech Invasion of Panama* (New York: St. Martin's Press, 1991), 198.

weighed against risks relative to the threat and the situation. However, the demise of the Sheridan armored gun system and the advent of the Army Interim Brigades, built around the LAV, serve as evidence of the need for such platforms. Light Armor can either fill the "interim" between first-to-arrive forces and heavier follow-on forces, or simply perform a wider variety of missions in a more permissible MOOTW environment in which the deployment of heavier forces is not anticipated. The value of such a vehicle to the expeditionary Marine Corps, with constraints on cube and weight aboard amphibious shipping, seems obvious.

The platoon with Task Force Bayonet worked with Army Sheridans in the attack on the Commandancia, where the LAVs provided direct fire support for Army troops engaged with PDF forces. In the search for Noriega, Marines participated in providing support for Special Forces searching Noriega's residence and that of his mistress. Later, the Marines assisted in securing the area around the Papal Nuncio's residence where Noriega took refuge.<sup>38</sup>

Following General Noriega's surrender, OPERATION PROMOTE LIBERTY began, which was aimed at legitimizing the newly-elected government. LAI units again served as an

integral part of this operation in which their mobility enabled an economy of force in providing support, over a broad area, to a variety of civic action efforts aimed at stabilizing the new government. LAI units, first Company D and later Company C, assisted the new Panamanian police forces, particularly in apprehending drug traffickers.<sup>39</sup> Additionally, the psychological value of the LAV could be leveraged in unusual ways. The Commander Marine Forces Panama, for example, noted in Lessons Learned of the psychological value of the LAV in these operations: "We discovered something about the LAV or 'tanquita'[little tank] as the Panamanians called it. People are interested in any large, unusual piece of equipment. One technique we commonly used during several operations was to coordinate with the local Special Forces and police to allow us to park an LAV in a prominent place in town. Although initially standoffish, the children first and then the older people would come by to look. Our Spanish speakers would go to work and soon the barriers were broken down and kids would be lifted onto the tanquitas for pictures. Leaflets obtained from the Army Psychological Operations

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<sup>38</sup> Colebaugh Interview, 10 January 2002.

<sup>39</sup> Ibid.

(PsyOps) Detachment were also provided.”<sup>40</sup> These and other civic actions were aimed at stabilizing a “new” nation.

In thirteen short months the “tanquitas” in Panama had participated in three major operations and numerous smaller ones. Their mobility enabled them to traverse the country with ease, to maintain freedom of movement for U.S. forces, provide security for convoys, conduct reconnaissance over large areas, move quickly to reinforce U.S. forces and facilities, and act in support of civic actions forces and missions over much of the country. Their flexibility permitted the LAI Companies to exercise restraint during tense pre-conflict situations, execute a variety of combat missions using the vehicle-scout team, and to provide security and reinforcement to civic action and the Panamanian Police after the cessation of hostilities. The firepower organic to the LAV was sufficient to deter or defeat their opposition. Anti-armor threats existed, but no real anti-armor effort was ever orchestrated, due in part to fear of the consequences.

### **Experience in Somalia**

It is also valuable to examine Light Armored Reconnaissance (LAR) participation in Somalia. In late

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<sup>40</sup> MCLLS #92559-41274

1992, military operations in Somalia were deemed necessary because the anarchical environment there prevented any effective distribution of food for famine relief by humanitarian relief organizations (HROs). U.S. Central Command formed Joint Task Force (JTF) Somalia in December 1992 to execute Operation Restore Hope in order to enable famine relief by creating a secure environment for the HROs.<sup>41</sup> The joint force was called the Unified Task Force (UNITAF). This operation preceded the subsequent UN-led United Nations Operation Somalia II (UNOSOM II), and is recognized as a highly successful operation.<sup>42</sup> The JTF accomplished the mission with minimal casualties (both to Somalis and Americans), of improving the flow of humanitarian assistance provided by the HROs. The military task force proved vital to restoring the humanitarian effort. A Center for Naval Analysis (CNA) report detailed the success of UNITAF: "To get their operations back to normal the HROs needed the military to protect: (1) the ports and airfields in order to move supplies into Somalia, (2) the warehouses and feeding sites near Mogadishu, (3) the movement of supplies to outlying areas, and (4) the

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<sup>41</sup> Center for Naval Analysis (CNA), Naval Studies Group, *Operation Restore Hope: Summary Report*, CRM 93-152, (Alexandria, VA: March 1994), 1.

<sup>42</sup>CNA, 1.

warehouses and feeding sites in those outlying areas."<sup>43</sup> In early December, 12,000 metric tons of supplies were trapped in Mogadishu. It was only thanks to UNITAF, which would conduct some 70 escorts and move 9,000 metric tons of supplies each month of the operation between December 1992 and May 1993, that this food could reach the intended recipients.<sup>44</sup> The UNITAF J-3 (Operations), Colonel Kennedy, described the impressive results: "With the arrival of UNITAF roads/ports/airfields opened, bribes no longer had to be paid, extensive dry food distribution in Mogadishu was started, programs expanded or initiated, new HROs opened operations in country (an increase from 21 to 44 HROs from December to April), schools opened and all food escorted by UNITAF forces reached its destination."<sup>45</sup>

LAVs came from Marine Expeditionary Units and a fly-in-company from 3<sup>rd</sup> LAR Battalion that would marry up with LAVs off of Maritime Pre-positioned Ships. The LAVs became the force of choice in providing convoy escorts to outlying areas, and in Mogadishu as well. Major Mark Brinkman, the acting LAR Company Commander, stated that amphibious assault vehicles (AAVs) would have reduced the speed of the convoy, while LAVs could outrun any vehicles hauling grain,

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<sup>43</sup> CNA, 3.

<sup>44</sup> Ibid, 23-27.

<sup>45</sup> MCLLS 63028-54664

thus maintaining a high tempo for convoy operations.<sup>46</sup> It was convenient having a unit already possessing the forces and equipment required for the mission vice having to take the time to reorganize and prepare another unit to perform the same mission. Another factor was the limitations of the roads. Even trucks and other wheeled vehicles would damage the roads so that each night engineers would have to conduct repairs to support traffic the next day, and tracked vehicles would have only further worsened the damage to the fragile road system.<sup>47</sup> Major Brinkman recalls that within the LAR Company every platoon was tasked with a mission every day, the demand was so high that escorts were run with a section of LAVs (2 vehicles) along with two armored HUMWVs in order to support all the tasks assigned. The distances to outlying areas were significant and required range and mobility; long convoys running from Mogadishu to Baidera were on a three-day turn around with a transit day out, a transit day back, and one day back followed by a repetition of the mission.<sup>48</sup> The 24<sup>th</sup> MEU (SOC) found LAVs very useful in providing security for HRO convoys. According to the Battalion Landing Team S-3 (Operations Officer): "While conducting convoy operations

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<sup>46</sup> Major Mark Brinkman, USMC, "Acting" Light Armored Reconnaissance Company Commander in Somalia, telephone interview by the author, 10 January 2002.

<sup>47</sup> *Ibid.*

within the Kismayo area, two LAV-25s were posted several kilometers forward and two were positioned to the rear of the convoy. The forward LAVs were particularly valuable as they provided both route reconnaissance and security. Their primary security function was to search civilian vehicles coming from the opposite direction. With their speed the LAVs could search a vehicle, relay the results back to the column, and resume their position without slowing down the convoy. The firepower available to the LAVs allowed them to operate independently."<sup>49</sup>

In addition to convoy escort security missions, the LAI company participated in raids on arms markets, and on 6 January 1993 in the seizure of a containment site where weapons were stored, to include heavy machineguns, anti-armor weapons, and Somali tanks. Marines confiscated a lot of weapons, to include those of the "technicals" whose heavy machineguns and RPGs constituted real threats to light armored vehicles. Major Brinkman stated that a real armor threat would have changed the playing field significantly, particularly in Mogadishu where the main concern remained machineguns and RPGs combined with the constrictive urban terrain.<sup>50</sup> However, based on the threat

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<sup>48</sup> Brinkman Interview, 10 January 2002.

<sup>49</sup> MCLLS #50215-69710

<sup>50</sup> Brinkman Interview, 10 January 2002.

and the situation, LAVs and scouts were often employed outside of the doctrinal "rules," where the psychologically-intimidating 8-foot high armored fighting vehicle bristling with weapons had an edge over trucks, HMMWVs, and AAVs. Given the additional requirements of confronting and disarming bandits, the obvious firepower and psychological intimidation of LAVs were invaluable. Additionally, the LAVs, as well as tanks, conducted mechanized-motorized patrols using night vision sights to gather information on the Somalis who had no similar capability.<sup>51</sup> The fielding of a thermal sight in 1996 on the LAV would be a significant enhancement for future operations.

The mobility and firepower of the LAV proved ideal for convoy operations in deterring violence and conducting movements deep into the interior. The use of Marines on HMMWVs and 5-ton trucks was quickly discontinued due to the LAV's advantages.<sup>52</sup> The flexibility of the vehicles was proven in the variety of missions they performed, ranging from reconnaissance and security to show of force, disarmament, support for civic action, MOUT operations, and

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<sup>51</sup> MCLLS #72459-74635

<sup>52</sup> Brinkman Interview, 10 January 2002.

as a raid and reaction force. This combination of flexible options seems ideal for MOOTW.

### **Experience in Kosovo**

In Kosovo, the LAV once again demonstrated its usefulness in MOOTW. As early as 1996, Army Captain Matthew Morton, writing in *Armor* magazine described the advantages of the Finnish wheeled armored vehicles he witnessed during a winter in Macedonia and sought to make a case for the Army to acquire the LAV which "provides the mobility and speed of a HMMWV and the protection of a M113. A QRF [quick reaction force] equipped with the LAV-25 would be an extremely lethal force in many OOTW scenarios."<sup>53</sup> In 1999, the Commander, Marine Forces Atlantic, was involved in the decision to deploy a company minus, vice the normal contingent of a platoon reinforced, aboard the MEU (SOC) bound to participate in operations in Kosovo in 1999.<sup>54</sup> Lieutenant Colonel J.L. Welsh of the 26th MEU (SOC) recommended the deployment of an LAV company with the next MEU, based on experience in Bosnia in 1998, and while acknowledging the firepower of the tank, found it "next to useless for operations and patrols in the MND AORs. LAVs

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<sup>53</sup>Captain Matthew D. Morton, USA, "Balkan Report II: Off-the-shelf Wheeled Armor Proves its Worth in Macedonian Winter," *Armor*, vol. 105, no4 (July-August 1996), 9.

and wheeled vehicles are the force of choice for operations and patrols conducted by the SFOR Strategic reserve force."<sup>55</sup> The LAR company was given, at one point, a separate area of responsibility to patrol and perform peacekeeping operations. Kenneth W. Estes writes in his book *Marines Under Armor*: "The light armored vehicles of the LAR battalions, by contrast [to tanks], continue to find favorable employment in the myriad of constabulary duties undertaken by Marine Corps forces in peacetime. The latest excursion to the Balkans, in wake of the NATO prosecution against Serbia in 1999, saw a reduced LAR company operating with Lt.Col. Bruce Gandy's 3d Battalion, 8<sup>th</sup> Marines in mobile security and armored reconnaissance missions in the province of Kosovo. Operating day and night, the LAV-25 patrols resembled the type of security actions long performed by similar units of the British and French armies in their overseas constabulary duties of yesteryear."<sup>56</sup> Again, the mobility and flexibility of the LAV were sought after while the firepower was sufficient to the perceived threat and acted as a deterrent to aggression.

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<sup>54</sup> Major William Jurney, USMC, S-3 (Operations) Officer for the Battalion Landing Team of the 26th Marine Expeditionary Unit in Kosovo, telephone interview by the author, 11 January 2002.

<sup>55</sup> MCLLS #20906-41656

## Analysis

These three case studies reflect real world tests of LAV performance. Joint Doctrine for Military Operations Other Than War lists *sixteen types of MOOTW operations*, and in these three contingencies *LAI/LAR performed seven of those*: Support to Counter-drug Operations, Enforcing Exclusion Zones, Ensuring Freedom of Navigation and Over-flight, Humanitarian Assistance, Military Support to Civil Authorities, Peace Operations, and Show of Force Operations.<sup>57</sup> And, possibly, two more MOOTW missions were covered in Arms Control and Noncombatant Evacuation Operations. Additionally, in all three contingencies, *LAI/LAR were called upon to execute four of the six standard reconnaissance and security missions*: Zone and Area Reconnaissance, Reconnaissance and Security, Route Reconnaissance and Security, and Counter-reconnaissance. Additionally, they performed *two of the five standard armor missions*: Hasty Attack and Deliberate Attack. Clearly the doctrinal missions exist in MOOTW for light armor to perform, and certainly the doctrinal employment of light armor is not at odds with the requirements of MOOTW.

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<sup>56</sup> Estes, 193.

<sup>57</sup> JCS, *Joint Pub 3-07*, III-1.

To go beyond doctrine and assess the effectiveness of the LAI/LAR units in these operations, the six warfighting functions (command and control, maneuver, fires, intelligence, logistics, and force protection) provide a useful framework for analysis.

The Marine Corps defines command and control as "the means by which a commander recognizes what needs to be done and sees to it that appropriate actions are taken."<sup>58</sup> The cavalry mission performed by light armor serves to extend the commander's situational awareness beyond the immediate close battle and creates for him a security zone with time and space to develop the situation to the commander's choosing. The LAV units' contributions to these missions were significant, especially given the use of only company-size elements. In each contingency, LAV units performed as an economy-of-force while executing missions critical to operational success. In fact, specific missions such as the securing of the area around the air base in Panama, the night reconnaissance missions and arms market raids in Somalia, and the conducting of security patrols in peace operations in Kosovo were accomplished using formations of less than a company. Yet each of these units provided the commander with the ability to recognize what needed to be

done and gave him the time and space in which to act decisively. Following the completion of OPERATION JUST CAUSE, the Commanding General of the 7<sup>th</sup> Infantry Division under which Marine Forces served stated "the LAVs were very, very useful." <sup>59</sup>

Maneuver is defined as "the movement of forces for the purpose of gaining an advantage over the enemy."<sup>60</sup> In Panama, the LAI company moved swiftly to seize the DNTT station with its communication equipment, then to seize the 10th Military Zone Headquarters, and finally to secure the area around the airfield, all before the PDF could mount any credible threat.<sup>61</sup> In Somalia, the LAR company was ideally suited to "rise at dawn" and move rapidly to conduct raids on those arms markets which were further out into the countryside, before the Somalis could react.<sup>62</sup> The tempo with which food convoys could move with their LAV security permitted them to get food to the distribution site and secure it before nightfall when bandits would otherwise strike.<sup>63</sup> In each of these cases the commander had a multipurpose, multimission platform with the necessary

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<sup>58</sup> MCRP 5-12.

<sup>59</sup> Interview by XVIII Airborne Corps Official Historian

<sup>60</sup> MCRP 5-12C.

<sup>61</sup> Colebaugh Interview, 10 January 2002.

<sup>62</sup> Brinkman Interview, 10 January 2002.

<sup>63</sup> Brinkman Interview, 10 January 2002.

speed, firepower, and reach (range of operations) with which to gain the advantage over an adversary.

Fires are defined as "those means used to delay, disrupt, degrade, or destroy enemy capabilities, forces, or facilities as well as affect the enemy's will to fight." As reconnaissance units, LAI/LAR had the communication equipment and training to coordinate indirect fires if necessary. While this capability was not used, it existed. What was significant was the direct fire capability resident in the LAI/LAR unit. The capability to use these direct fires to "delay, disrupt, degrade, or destroy" often served to deter possible aggression, and when used proved effective in these MOOTW contingencies. The LAV's firepower is impressive relative to anything outside of a tank. An LAV company has as many 7.62mm Machine Guns as an Infantry Battalion plus the M242 25mm automatic chain-gun with both armor piercing and high explosive rounds. TOW anti-tank variants and mortars for immediate suppression and marking for air round out the organic firepower for a single company. The deterrent effect of this firepower is evident as seen in Panama, when a negligent discharge cut a telephone pole in half and created such an impression on an angry crowd that it rapidly dispersed, and in Somalia when an LAV-25 shot at a tank, leading the Somalis to abandon a

vehicle the LAV was incapable of destroying. These are more extreme examples when weapons were actually discharged but they serve to make the point that the LAV's firepower is credible. This is a valuable tool to the commander whether conducting peacekeeping patrols in Kosovo, providing convoy escort in Somalia, or assisting police in drug enforcement in Panama.

Intelligence is "the knowledge about the enemy or the surrounding environment needed to support decision making."<sup>64</sup> Reconnaissance is the means for the commander to acquire this knowledge and the mission for which the LAV is designed and best suited. As discussed earlier, LAI/LAR conducted standard security and reconnaissance missions in each of these contingencies. LAI conducted route reconnaissance and security in Panama before and during Operation Just Cause. In fact, LAI conducted reconnaissance of possible objectives before the operation to identify routes and positions in advance for both LAI and other US forces.<sup>65</sup> In Somalia, the LAVs conducted night patrols using night vision devices to gather information on Somali activities for the commander, and certainly conducted reconnaissance along routes from Mogadishu to food

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<sup>64</sup> *MCRP 5-12C.*

<sup>65</sup> Colebaugh Interview, 10 January 2002.

distribution centers in outlying areas. In Kosovo, the LAVs could conduct security patrols to identify threatening activity early in order to provide the commander time to act and eliminate threats to the ceasefire. In each situation a unit of less than company size was able to reconnoiter a relatively large area for the commander at a great economy in force. The units can conduct both mounted (on the vehicle) and dismounted (scouts) reconnaissance, and they can operate with greater speed and security than truck, HMMWV, or AAV-mounted Marines.

Logistics is defined as "all activities required to move and sustain military forces."<sup>66</sup> MOOTW, as "smaller-scale" contingencies, do not represent the deployment forward of significant forces and logistical support forces, and cost or political considerations may require a smaller US presence. Hence, the movement and sustainment of forces is predicated on the limited logistical support capability organic to a MEU, coming off an MPF ship, or perhaps through a host nation support agreement. The ability to move and sustain forces may either be limited or costly. First, some comparisons are useful:

M1A1 tank can range 289 miles on 505 gallons of fuel, has a rate of speed of 42 mph on a highway (and excellent cross country mobility), and weighs 67 short tons.

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<sup>66</sup> MCRP 5-12C.

Amphibious Assault Vehicle can range 200 miles on 171 gallons of fuel, can move at 25 mph on the highway (is truly amphibious), and weighs 26.5 short tons.

LAV can range 410 miles (320 in Somalia) on 71 gallons of fuel, can speed along the highway at 62 mph, and weighs 14.2 short tons.

5-ton truck can range 300 miles on 82 gallons of fuel, can speed on the highway at 55 mph, and weighs 9 short tons.<sup>67</sup>

The tank consumes great quantities of fuel, and one sixcon trailer, which can carry 900 gallons of fuel, is not enough to refuel even two tanks. The tank's weight will tear up roads and may be too much for bridges. Bridging and vehicle recovery assets require additional logistic planning.

Sustainability becomes a major challenge. The AAV is excellent for transporting Marines, but it is very slow and lacks main gun firepower, tracks can tear up roads, and fuel consumption is significant as well. The 5-ton truck can transport Marines, but is a soft target and may require escort.

The LAV, on the other hand, combines the advantages of all these vehicles, as it possesses speed, firepower, and fuel efficiency while transporting its own Marines (scouts). The bottom line remains that the use of an asset will be driven by the mission, the threat, and any other restraints or constraints placed on the commander. The Light Armored Vehicle is a wide-use platform with range comparable to any other wheeled vehicle, and much better

firepower, combined with armor protection against small arms (and rocks and automobiles). Although tanks have much greater firepower and survivability, their fuel consumption is tremendous, and logistical requirements for tanks for classes III, V, and IX supply can be a significant limiting factor. In contrast, LAVs in OPERATION JUST CAUSE were able to execute their missions on a single tank of fuel.<sup>68</sup> And, LAVs operating in Somalia even in 115-degree heat on very poor roads averaged 320-350 miles per tank of fuel.<sup>69</sup> What we see here in comparison and in the review of three MOOTW case studies is that AAV-mounted Marines, or Infantry, or tanks could have performed individual pieces of the missions best, but the LAV proved most flexible while imposing the least logistical strain, resulting in the best performance in the mission overall.

Force protection is defined as "actions or efforts used to safeguard own centers of gravity while protecting, concealing, reducing, or eliminating friendly critical vulnerabilities."<sup>70</sup> The LAV's armor protection, against small arms is valuable in a MOOTW environment without having to make the tradeoffs for the greater survivability of the tank: increasing weight and wear on roads and

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<sup>67</sup> MSTP Pamphlet 5-0.3, *MAGTF Planner's Reference Manual* (Quantico, VA: MCCDC, 20 April 2001), 21-22.

<sup>68</sup> Colebaugh Interview, 10 January 2002.

<sup>69</sup> MCLLS #50215-09533

bridges, increased fuel consumption, and no organic scout/infantry. For example, tanks were restricted in Panama before and after OPERATION JUST CAUSE to avoid tearing up roads. In Kosovo, another consideration was that the tank was too threatening, while the LAV created a lighter psychological impact.<sup>71</sup> With the AAV, there is no improvement in armor protection and the loss in speed and firepower makes it more vulnerable and limitations on tracked vehicles tearing up roads applies to the AAV as well. Repeatedly, the psychological effect of an armored vehicle bristling with weapons was sufficient to deter, and the armor, limited as it is, protected occupants from having to escalate the force required when dealing with hostile crowds. Additionally, the scouts are an essential part of the vehicle's security. LAI/LAR units possessed the credible capacity to coerce or deter, the necessary protection to exercise restraint, the necessary speed to escape, and the firepower needed, relative to the threat, to defend. In MOOTW, where force protection issues are given greater weight than in conflict at the major theater warfare level, the LAV represents a flexible, sustainable

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<sup>70</sup> MCRP 5-12C.

<sup>71</sup> Journey Interview, 11 January 2002.

platform with the necessary force protection to accomplish a wide variety of missions.

To become centered on the platform in a discussion of the warfighting functions is to miss a critical part of the LAR unit's capability. The infantry scouts are an integral part of the LAR unit and, as seen in the three case studies, their contributions were essential to the success of the missions. Scouts provided protection for the vehicles, conducted dismounted reconnaissance and surveillance, conducted searches of people and vehicles, cleared buildings and obstacles, and participated in civic action roles in getting face to face with the local peoples. "The primary mission of the dismounted riflemen is to enhance the reconnaissance and screening capabilities of the organization and provide limited pioneer and demolition tasks as required. In addition, dismounted riflemen provide for the close physical security of the vehicles during the unit's assigned mission. Dismounted riflemen may participate in offensive and defensive operations, but are not routinely utilized as an assault force."<sup>72</sup> The scouts performed all of these missions, and some, during three short MOOTW experiences.

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<sup>72</sup>*Operational Handbook (OH) 6-6, Marine Light Armor Employment*, (Quantico, VA: September 1985), 9-1.

## Conclusions

The effectiveness of the LAI/LAR units in performing their roles in these contingencies is evident. The capabilities and role of the LAV, particularly in MOOTW, are worth preserving if the Marine Corps desires to remain relevant as a force in readiness for future MOOTW contingencies. In short, the LAV and its eventual replacement represent the vehicle of choice for the Marine Corps in MOOTW.

The U.S. Army appears to have recognized the value of such vehicles and is spending some \$4 billion to purchase 2,000 3rd generation Light Armored Vehicles in a major shift from tracks to wheels. In particular, this shift is in recognition of the demonstrated cross-country mobility of this wheeled vehicle and the simplified logistics and maintenance required by forward-deployed units away from fixed infrastructure.<sup>73</sup> This transition is all the more remarkable given that the "Cold War" Army passed on the acquisition of the LAV during the early eighties. However, the post-cold war era saw an explosion in "smaller-scale contingencies" over the last decade, with the accompanying need for deployable and versatile forces. Specifically, in

discussing this major shift with the decision to acquire LAVs, the U.S. Army's *Armor* magazine makes explicit reference to "an earlier version of the LAV [that] entered Marine Corps service in 1983, and was employed in Operation Just Cause in Panama. LAVs were also employed in Desert Storm, IFOR and KFOR in the Balkans, and in Somalia."<sup>74</sup>

Certainly, this utility was not lost on senior leaders who deployed a company to marry up with vehicles off of MPF shipping for Somalia, or who changed an entire Unit Deployment Program in order to provide a company for operations in Kosovo. These decisions were made based on the effectiveness of LAV units in MOOTW and their significance to the larger, operational mission. Such task organization decisions are made for must-have capabilities, not merely for nice-to-have capabilities.

During the Authorized Acquisition Objective Tailoring Conference held by Marine Corps Systems Command, in 2001, a recommendation was reviewed for reductions in the authorized allowance of LAVs from 771 to 668 in the Marine Corps. These reductions would have seen the elimination of the Equipment Allowance Pool (EAP) at the Marine Corps Ground Combat Center, 29 Palms, California, and a reduction in the depot maintenance float allowance.

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<sup>73</sup>*Armor*, (January-February 2001), 13-15.

The reductions would have likely resulted in an eventual degradation in readiness without EAP vehicles to support Combined Arms Exercise (CAX) program, and with fewer vehicles in the maintenance float to maintain a more rapid replacement turn-around. The LAV platform was the only program to avoid these types of reductions because of its unique capabilities and opportunities for upgrades.<sup>75</sup>

The last twenty years have seen the acquisition, deployment, and employment of the Light Armored Vehicle to great success in a number of the very "smaller-scale contingency operations" described in the *National Security Strategy*. The ongoing Service Life Extension Program (SLEP) will serve to take the vehicle to 2015. Until then, the LAV will remain a superb asset for the Marine Air Ground Task Force (MAGTF) in performing Military Operations Other Than War.

The significant contributions of the Light Armored Vehicle and its Marines in MOOTW operations warrant inclusion in the SLEP of a laser designator and the add-on camouflage panels, both of which are facing elimination as part of the SLEP. The LAV and tank replacement is to be the Marine Expeditionary Family of Fighting Vehicles (MEFFV).

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<sup>74</sup> *Armor*, (January-February 2001), 14-15.

<sup>75</sup> Colebaugh Interview, 10 January 2002.

Seeking to create an expeditionary vehicle that is deployable and sustainable like the LAV and survivable like the tank the MEFFV faces the challenge of designing a vehicle between 10 and 30 tons that can replace both systems.<sup>76</sup> Many difficult choices will have to be made in developing the MEFFV, involving tradeoffs between LAV and tank capabilities and limitations. For example, greater survivability is still tied to greater weight, but with greater survivability (weight) comes the increased likelihood of tracks over wheels, which proved a limiting factor in past MOOTW experiences. The LAV has only .5 inch of aluminum armor and is unavoidably more vulnerable -- it is neither a tank nor a tank killer. To be sure, without a tank, the Marine Corps would lose the shock-power, firepower, and armor-killing capabilities so valuable in combat or as needed to deal with a more robust or determined threat in MOOTW. However, neither should the capabilities of the LAV be lost, given the proven utility of the LAV to Marine Corps and Joint commanders conducting Operations Other Than War with expeditionary forces -- even if that tradeoff means less than tank-like survivability and firepower.

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<sup>76</sup> Colonel Dennis W. Beal, *MAGTF Expeditionary Family of Fighting Vehicles (MEFFV)*, presentation at Marine Corps University by Project Director MEFFV, Quantico, VA: September 2001.

### Recommendations

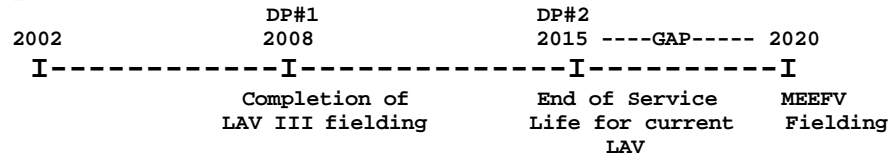
The case studies prove that these capabilities should be retained. However, it is important to look ahead at the challenges and decision points facing Marine leaders responsible for replacing the current LAV. The SLEP will extend the serviceability of the current LAV until 2015. The MEFFV is to arrive circa 2020, assuming no delays. There is a five-year gap, more if there are delays in the MEFFV development and acquisition process, which the Marine Corps must address in order to maintain uninterrupted LAV capability.

Concurrently, the U.S. Army will purchase 2,131 LAV III's between FY 2002 and FY 2008. These vehicles weigh an additional 10,000 pounds and are longer, wider, and taller than the generation one LAV currently in use by the Marine Corps.<sup>77</sup> This is important should the Marine Corps decide to in the future to pursue this vehicle instead of the MEFFV. The increase in cube and weight is problematic, but not insolvable, for a service that must plan the embarkation of amphibious shipping and landing craft.

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<sup>77</sup> Colebaugh interview, 10 January 2002.

The figure below represents these events on a timeline, and identifies the location of two critical decision points for current and future Marine Corps Leadership.



The Marine Corps must decide by 2008 whether to fund a Service Life Extension Program Enhancement (SLEP-E) to extend the current vehicle beyond 2015 while continuing to pursue the MEEFV, or to move forward with purchase of either the LAV III or a smaller like vehicle to be fielded in 2015. If the Marine Corps chooses to conduct a SLEP-E while pursuing the MEEFV then a second decision point arrives in 2015. An assessment must be made to either continue with the MEEFV or to field the LAV III or a smaller like vehicle by 2022. These decision points are based on the author's understanding that seven years is sufficient for planning in the Fiscal Year Defense Plan budget cycle. The timing of the decision point can move, but the critical decision remains the same

Failure to recognize and act on these critical decision points could leave the Marine Corps without a

valuable capability, and a vacuum the U.S. Army will seek to fill.

The MEFFV will be fielded around 2020 assuming no funding problems or delays in acquisition; however, the experience with the painful delays in pursuit of the tilt-rotor technology of the MV-22 Osprey and the Advanced Amphibious Assault Vehicle (AAAV) serve as a caution to this assumption. The Marine Corps should for now aggressively pursue the development of the MEFFV to guarantee that these capabilities are resident for the use of future commanders. Additionally, the Marine Corps must be prepared to act decisively in the event the MEFFV is not the answer to acquire a new system, perhaps using the off-the-shelf technology of the LAV II or III. In the interim, the Marine Corps must guard against the chipping away of current capabilities by such actions as the reductions proposed during the Authorized Acquisition Objective Tailoring Conference. Finally, the SLEP and future modifications should seek to provide this proven platform with every advantage if it is to continue to remain such a viable asset to future commanders who will be expected to successfully perform missions across the full spectrum of conflict.



## **Bibliography**

### **Primary Sources:**

Mauskopf, R.P., Colonel, USMC and Powers, E.W., Major, USMC, "LAVs in Action," The Marine Corps Gazette, no 9 (September 1990): 50-59.

Hayes, J.M., Colonel, USMC, "Panama PROMOTE LIBERTY After Action Report," The Marine Corps Gazette, no 9 (September 1990): 59-62.

Major Brian C. Colebaugh, USMC, with the Program Manager Light Armored Vehicle, Transportation and Automotive Command, Warren MI, telephonic interview of 11 January 2001.

Major Mark Brinkman, USMC, with the Program Manager Light Armored Vehicle, Transportation and Automotive Command, Warren MI, telephonic interview of 11 January 2001.

Major William C. Journey, USMC, with Recruiting Station Baltimore MD, 4<sup>th</sup> Marine Corps District, preliminary (telephonic) interview of 10 January 2001.

Armor Editorial Staff, "Army Selects LAV III Variants to Equip New Interim Brigades," Armor, no 1 (January-February 2001): 13-15.

Lieutenant General Carmen Cavezza USA, former Commanding General, 7<sup>th</sup> Infantry Division, remarks from interview transcript (Ft Lewis, Washington: 30 April 1992), U.S. Army Center of Military History, URL: <http://www.army.mil/cmhh-pg/documents/panama/jcit/jcit.html> , accessed 8 January 2002.

Colonel Dennis W. Beal, "MAGTF Expeditionary Family of Fighting Vehicles (MEFFV)," presentation at Marine Corps University by Project Director, MEFFV, Quantico, VA, September 2001.

A National Security Strategy For A New Century (The White House: December 1999)

### **Secondary Sources:**

Operation Just Cause: The U.S. Intervention in Panama. Eds. Bruce W. Watson and Peter G Tsouras, Boulder, Colorado: Westview Press, 1991.

McConnell, Malcom, Just Cause: The Real Story of America's High-Tech Invasion of Panama. New York: St. Martin's Press, 1991.

Estes, Kenneth W., Marines under Armor: The Marine Corps and the Armored Fighting Vehicle. 1916-2000. Annapolis, Maryland: Naval Institute Press, 2000.

Center for Naval Analyses, Naval Studies Group, Operation Restore Hope: Summary Report. CRM 93-152. Alexandria, VA: March 1994

Donnelly, Thomas, Margaret Roth, and Caleb Baker. Operation Just Cause: The Storming of Panama. New York, NY: Lexington Books, 1991.

Fenton, George P., LtCol, USMC, Marine Expeditionary Units (Special Operations Capable) at the Operational Level in Military Operations Other Than War. Monograph. Newport, RI: Naval War College, June 1994.

Morton, Matthew D., Captain, USA, "Balkan Report II: Off-the-shelf Wheeled Armor Proves its Worth in Macedonian Winter," *Armor*, no 4 (July-August 1994): 7-10.

Vowels, Lawrence G. and Witsken, Jeffrey R., Major, USA, "Peacekeeping With Light Cavalry," *Armor*, no 5 (September-October 1994): 26-30.

### **Reference Sources:**

Joint Chiefs of Staff. Joint Pub 3-07, "Joint Doctrine for Military Operations Other Than War," Washington, DC: GPO, 16 June 1995.

Joint Chiefs of Staff. Joint Pub 1-02, "Department of Defense Dictionary of Military and Associated Terms," Washington, DC: GPO, 1 December 1989.

Department of the Navy. Marine Corps reference publication 5-12. "Marine Corps Supplement to the Department of Defense Dictionary of Military and Associated Terms," 88.

Field Manual (FM) 17-18, Light Armor Operations, Washington, DC: Department of the Army. March 1994.

Fleet Marine Forces Manual (FMFM) 6-30, Light Armored Infantry Operations, Quantico, VA: Marine Corps Combat Development Command. October 1990.

Operational Handbook (OH) 6-6, Marine Light Armor Employment, Quantico, VA: September 1985.

Marine Corps Reference Publication (MCRP) 5-12D, Organization of Marine Corps Forces, Washington, DC: Headquarters U.S. Marine Corps. October 1998.

Bonn, Keith E., LTC, USA (Ret.), and MSG Anthony E. Baker USAR (Ret.) Guide to Military Operations Other Than War: Tactics, Techniques, and Procedures for Stability and Support Operations, Domestic and International. Mechanicsburg, PA: Stackpole Books, 2000.

MAGTF Staff Training Program Pamphlet 5-03, MAGTF Planner's Reference Manual. n.p., U.S. Marine Corps. April 2001.

Marine Corps Lessons Learned System:

1. Light Armored Vehicle, CQBT, and HB teams combined operations, JULLS # 12559-16914.
2. Light Armored Vehicle (LAV) people magnet, JULLS # 92559-41274.
3. Summary – Marine Forces Panama, PROMOTE LIBERTY Operations, JULLS # 92558-776575.
4. Light Armored Vehicles vs. Tanks for MEU deployments to Bosnia, JULLS # 20906-41656.
5. Armor in MOUT/LIC/Humanitarian Effort, JULLS # 72459-79635.
6. LAVs as forward security during convoy operations, JULLS #50215-69710.
7. Summary – Operation RESTORE HOPE, JULLS # 40266-19543.
8. Security of Humanitarian Relief Organizations (HROs), JULLS # 63028-54664.
9. 24<sup>th</sup> MEU (SOC) operations in and around Kismayo, Somalia, JULLS # 50215-09533.